

IN THE CLAIMS

1. (Currently Amended) Device comprising a waveguiding substrate and a diffractive ~~Diffractive~~-grating element arranged on or embedded within ~~a light-transmissive said waveguiding~~-substrate and arranged to interact with an incident light wave in order to couple energy from said incident light wave into said substrate to form at least one diffracted light wave propagating within said substrate in a direction of and corresponding to at least one selected diffraction order, said wherein ~~the grating element comprising is divided into~~ at least two different grating regions ~~each~~-having different diffractive properties and arranged on opposite sides with respect to a transition point, ~~wherein to form a splitted grating element, where~~ diffractions generated by said at least two different grating regions are arranged to mutually compensate for an effect of a variation in input angle of said the incident light wave ~~to at a given point of the grating on~~ a total diffraction efficiency of ~~said the~~ at least one diffracted light wave propagating within said substrate.

2. (Currently Amended) The device ~~diffractive grating element~~ according to the claim 1, wherein ~~in said splitted grating element~~ a grating profile of at least one of the grating regions has an asymmetric period profile, preferably a blazed period profile.

3. (Currently Amended) The device ~~diffractive grating element~~ according to the claim 1, wherein said regions are splitted ~~grating element is~~ arranged to be symmetrically splitted, that is, the ~~element comprises two different~~ grating regions have ~~having~~ grating period profiles arranged as substantially mirror images of each other with respect to a transition point.

4. (Currently Amended) The device ~~diffractive grating element~~ according to the claim 1, wherein said ~~splitted grating element comprises~~ at least two different grating regions have ~~having~~ grating period profiles with substantially different depths.

5. (Currently Amended) The ~~diffractive grating element device~~ according to the claim 1, wherein ~~in said splitted grating element~~ diffraction efficiency of at least one of the grating regions is arranged to vary at different local distances measured from the transition point.

6. (Currently Amended) The ~~device diffractive grating element~~ according to the claim 1, wherein the transition point is located within an area where the incident light wave first interacts with the diffractive splitted grating element.

7. (Currently Amended) The ~~device diffractive grating element~~ according to the claim 1, wherein a first interaction of the incident light wave with the diffractive splitted grating element is arranged to take place substantially within a single grating region.

8. (Currently Amended) The ~~device diffractive grating element~~ according to the claim 7, wherein at least one of the grating regions is arranged to redirect or recirculate the light wave waveguided within the substrate back towards a reverse direction inside the substrate.

9. (Currently Amended) The ~~device diffractive grating element~~ according to the claim 1, wherein the diffractive splitted grating element is arranged to enlarge an exit pupil of an optical system.

10. (Currently Amended) The ~~device diffractive grating element~~ according to the claim 1, wherein the diffractive splitted grating element is arranged to enlarge an exit pupil of a biocular or monocular optical system.

11. (Currently Amended) The ~~device diffractive grating element~~ according to the claim 1, wherein the diffractive splitted grating element is arranged to enlarge an exit pupil of a virtual display.

12. (New) A device comprising  
a waveguiding substrate;  
an imager having a first image point and a second image point;

input optics to direct light from said first image point towards said substrate to form a first incident light wave and to direct light from said second image point towards said substrate to form a second incident light wave; and  
a diffractive grating element arranged to couple energy of said first incident light wave into said substrate to form first diffracted light waves propagating within said substrate in a direction of a first selected diffraction order and to form second diffracted light waves propagating within said substrate in a direction of a second selected diffraction order, said diffractive grating element also being arranged to couple energy of said second incident light wave into said substrate to form first diffracted light waves propagating within said substrate in a direction of said first selected diffraction order and to form second diffracted light waves propagating within said substrate in a direction of said second selected diffraction order, wherein said diffractive grating element comprises at least two different grating regions having different diffractive properties such that distribution of light between the direction of said first selected diffraction order and the direction of said second selected diffraction order is arranged to remain substantially the same when light is directed from said second image point instead of light being directed from said first image point.

13. (New) The device according to claim 12 wherein said first image point is located in the center of a surface of said imager and said second image point is located near the edge of the surface of said imager.

14. (New) The device according to claim 12 wherein said input optics is further arranged to shift said second incident light wave on said grating element with respect to said first incident light wave.

15. (New) Apparatus comprising  
waveguiding substrate means;  
imager means having a first image point and a second image point;

input optics means to direct light from said first image point towards said substrate means to form a first incident light wave and to direct light from said second image point towards said substrate to form a second incident light wave; and  
a diffractive grating means arranged to couple energy of said first incident light wave into said substrate to form first diffracted light waves propagating within said substrate in a direction of a first selected diffraction order and to form second diffracted light waves propagating within said substrate in a direction of a second selected diffraction order, said diffractive grating means also being arranged to couple energy of said second incident light wave into said substrate to form first diffracted light waves propagating within said substrate in a direction of said first selected diffraction order and to form second diffracted light waves propagating within said substrate in a direction of said second selected diffraction order, wherein said diffractive grating means comprises at least two different grating regions having different diffractive properties such that distribution of light between the direction of said first selected diffraction order and the direction of said second selected diffraction order is arranged to remain substantially the same when light is directed from said second image point instead of light being directed from said first image point.